CLAIMS

1. A method for preparing a hybrid aluminosilicate polymer, comprising the following steps:

a) treating a mixed aluminum and silicon alkoxide of which the silicon has both hydrolyzable substituents and a non-hydrolyzable substituent, or a mixed aluminum and silicon precursor resulting from the hydrolysis of a mixture of aluminum compounds and silicon compounds only having hydrolyzable substituents and silicon compounds having a non-hydrolyzable substituent, with an aqueous alkali, in the presence of silanol groups, the aluminum concentration being maintained at less than 0.3 mol/l, the Al/Si molar ratio being maintained between 1 and 3.6 and the alkali/Al molar ratio being maintained between 2.3 and 3;
b) stirring the mixture resulting from step a) at ambient temperature in the presence of silanol groups long enough to form the hybrid aluminosilicate polymer; and
c) eliminating the byproducts formed during steps a) and b) from the reaction medium.

2. The method according to Claim 1, wherein the alkali of step a) is selected from the group consisting of sodium, potassium, and lithium hydroxide, diethylamine and triethylamine.

3. The method according to Claim 1, wherein the silanol groups are supplied in silica or glass bead form.

4. The method according to Claim 3, wherein the silica or glass beads have a diameter between 0.2 and 5 mm.

5. The method according to Claim 1, wherein the aluminum concentration is maintained between 1.4×10^{-2} and 0.3 mol/l.

6. The method according to Claim 1, wherein the aluminum concentration is maintained between 4.3 x 10^{-2} and 0.3 mol/l.

7. The method according to Claim 1, wherein said alkali/Al molar ratio is about 2.3.

8. The method according to Claim 1, wherein said alkali/Al molar ratio is about 3.

9. The method according to Claim 1, comprising, after step b) and before step c), a step d), by which alkali is added in order to reach an alkali/Al molar ratio of 3 if this ratio has not already been reached in step a).

10. The method according to Claim 1, wherein the mixed aluminum and silicon precursor resulting from hydrolysis of a mixture of aluminum compounds and silicon compounds only having hydrolyzable substituents and silicon compounds having a non-hydrolyzable substituent is a product resulting from the mixture in an aqueous medium (i) of a compound selected from the group consisting of aluminum salts, aluminum alkoxides and aluminum halogenoalkoxides and (ii) at least one compound selected from the group consisting of silicon alkoxides and chloroalkoxides only having hydrolyzable substituents, and (iii) at least one compound selected from the group consisting of silicon alkoxides and chloroalkoxides having a non-hydrolyzable substituent.

11. The method according to Claim 10, wherein said mixed aluminum and silicon precursor is the product resulting from the mixture (i) of an aluminum halide and (ii) a mixture having at least one silicon alkoxide only having hydrolyzable substituents and at least one silicon alkoxide having a non-hydrolyzable substituent.

12. The method according to Claim 11, wherein the ratio of silicon alkoxide only having hydrolyzable substituents to silicon alkoxide having a non-hydrolyzable substituent is between 0.1 and 10 in moles silicon.

13. The method according to Claim 12, wherein the ratio of silicon alkoxide only having hydrolyzable substituents to silicon alkoxide having a non-hydrolyzable substituent is 1 in moles silicon.

14. The method according to Claim 10, wherein the silicon alkoxide having a non-hydrolyzable substituent is represented by the formula

$$R'\text{-}Si\text{-}(OR)_3$$

where R represents an alkyl group comprising 1 to 5 carbon atoms
R' represents H, F, or a substituted or unsubstituted non-linear or ramified alkyl or alkenyl group comprising 1 to 8 carbon atoms.

15. The method according to Claim 14, wherein R' represents a methyl, ethyl, n-propyl, n-butyl, 3-chloropropyl, vinyl group.

16. The method according to Claim 15, wherein said silicon alkoxide having a non-hydrolyzable substituent is methyltriethoxysilane or vinyltriethoxysilane.

17. The method according to Claim 11, wherein said silicon alkoxide only having hydrolyzable substituents is tetramethyl orthosilicate or tetraethyl orthosilicate.

18. The method according to Claim 1, comprising, after step c), a step e), by which at least one chelating agent of aluminum is added to the hybrid aluminosilicate polymer resulting from step c).

19. The method according to Claim 18, wherein said chelating agent of aluminum is selected from the group consisting of carboxylic acids, phosphonic acids, sulfonic acids, difunctional acids, their ester and anhydride components and amino acids.

20. The method according to Claim 19, wherein said chelating agent of aluminum is selected from the group consisting of HCOOH, R_1COOH wherein R_1 is selected from the group consisting of $CH_3(CH_2)_n$, n being between to 0 and 12, CF_3, C_6H_5, $(C_6H_5)_2$, substituted aromatic rings, C_4H_4S; $R_2PO(OH)_2$ wherein R_2 is selected from the group consisting of CH_3, C_6H_5; R_3SO_3H wherein R_3 is $CH_3(CH_2)_n$, n being between to 0 and 5; $HOOC(CH_2)_nCOOH$, n = 0-8; aromatic difunctional acids; $HOOC(CH_2)_nPO(OH)_2$, n = 2, 4; hydroxy aliphatic acids; $HOOC(CH_2OH)_nCOOH$, n = 1-2; $CH_3CH(NH_2)COOH$.

21. The method according to Claim 18, wherein step e) comprises a first adding of acetic acid and a following adding of another different chelating agent of aluminum.

22. The method according to Claim 18, wherein the amount of chelating agent of aluminum corresponds to a molar ratio between chelating functions of the chelating agent and aluminum of the hybrid aluminosilicate polymer comprised between 0.1 and 10.

23. A material obtainable by the method according to Claim 1.

24. The material according to Claim 23, characterized in that its Raman spectrum comprises in spectral region 200-600 cm^{-1} a wide band at 250±6 cm^{-1}, a wide intense band at 359±6 cm^{-1}, a shoulder at 407±7 cm^{-1}, and a wide band at 501±6 cm^{-1}, as well as bands corresponding to the silicon non-hydrolyzable substituent, wherein the bands linked to the non-hydrolyzable

substituent can be juxtaposed with other bands, the Raman spectrum being produced for the material resulting from step b) and before step c).